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# Is Bigger Always Better?

## The Effect of Body Mass on Physical Characteristics of English Academy Rugby Union Players

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### Introduction

- Physical characteristics are important for performance and progression in rugby union (Duthie, 2006).
- Practitioners are required to increase body mass, strength, power, sprint acceleration, maximal sprint velocity, and aerobic fitness.
- Increased body mass may augment or attenuate the these physical characteristics.
- Within a rugby union academy body size increases with increased age (Darrall-Jones et al. 2015).
- Therefore, the purpose of the study was to determine if between-age category differences in strength, power, sprint acceleration, maximal sprint velocity, and aerobic fitness could be explained by differences in body mass in English Academy rugby union players.

### Methods

- Data were collected for isometric mid-thigh pull peak force (IMTP<sub>pf</sub>), countermovement jump height (CMJ<sub>h</sub>) and peak power (CMJ<sub>pp</sub>), 10 m velocity (10mV), maximal velocity (Vmax) and 30-15 Intermittent Fitness Test (30-15<sub>IFT</sub>) for under 16 (U16), under 18 (U18) and under 21 (U21) age categories; **Table 1**.
- Between-age category differences in physical characteristics were compared with and without covariate adjustment for body mass, using magnitude-based inferences.

**Table 1.** Anthropometric Characteristics of English Academy Rugby Union players.

	U16 n = 61	U18 n = 50	U21 n = 25
Age (years)	15.6 ± 0.3	16.9 ± 0.6	19.1 ± 1.1
Height (cm)	178.8 ± 7.2	183.1 ± 6.6	185.3 ± 6.5
Body Mass (kg)	78.9 ± 11.4	86.1 ± 11.4	96.3 ± 12.6

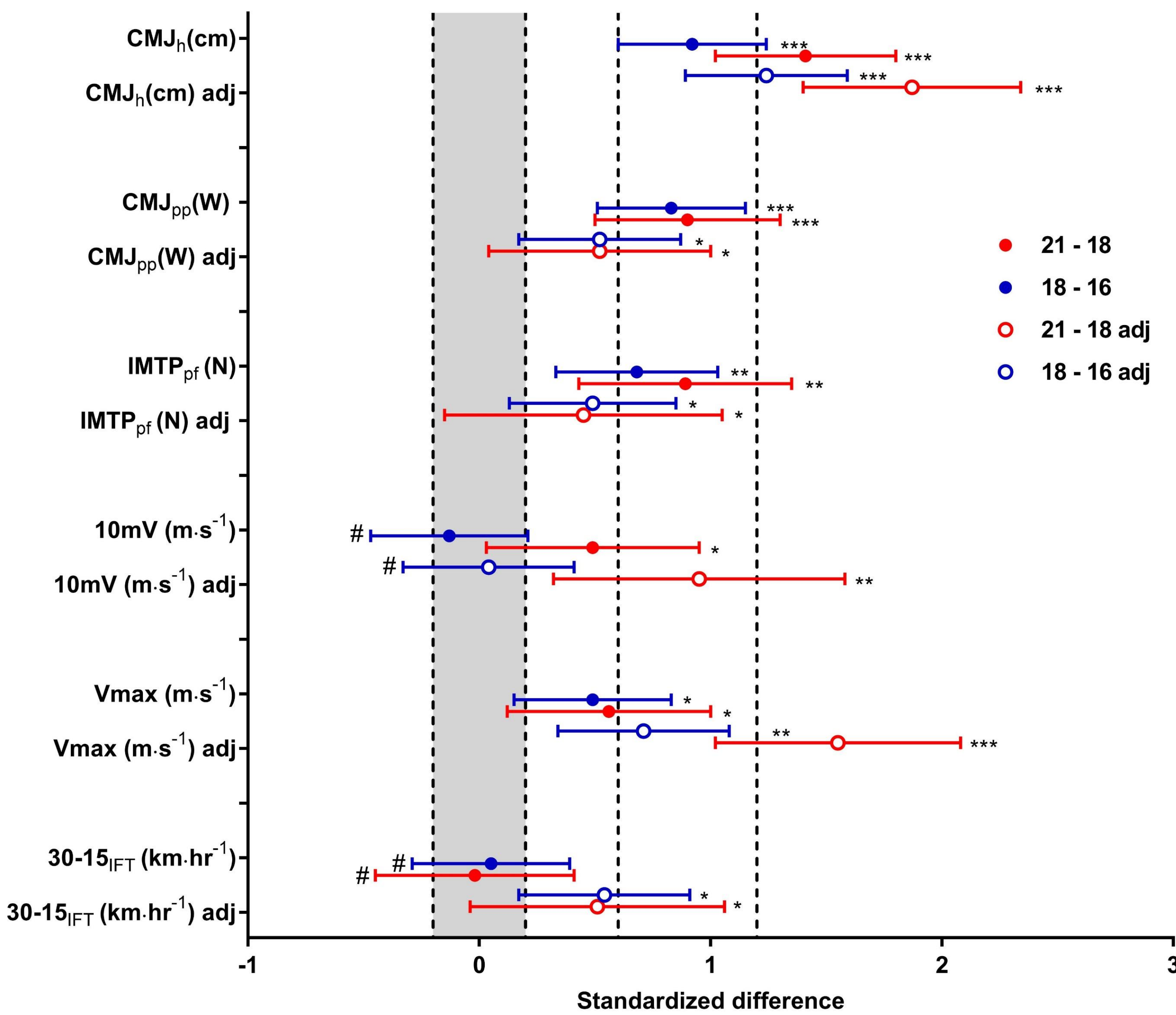
Data presented as mean (±SD).

### Results

**Table 2.** Countermovement jump height and peak power, isometric mid-thigh pull peak force, 10 m and maximal sprint velocity and 30-15 Intermittent Fitness Test speed data; including data adjusted for body mass.

	U16	U18	U21
CMJ <sub>h</sub> (cm)	34.8 ± 4.8	39.3 ± 5.0	45.8 ± 4.3
CMJ <sub>h</sub> (cm) adjusted for Body Mass	33.5 ± 13.8	39.1 ± 12.5	47.5 ± 8.7
CMJ <sub>pp</sub> (W)	3997.5 ± 588.6	4512.8 ± 624.9	5074.5 ± 630.4
CMJ <sub>pp</sub> (W) adjusted for Body Mass	4176.3 ± 11.6	4432.0 ± 12.2	4679.8 ± 9.4
IMTP <sub>pf</sub> (N)	2585.5 ± 412.6	2868.8 ± 433.1	3286.1 ± 493.0
IMTP <sub>pf</sub> (N) adjusted for Body Mass	2640.9 ± 15.2	2825.0 ± 13.9	2996.9 ± 13.9
10mV (m·s <sup>-1</sup> )	5.55 ± 0.26	5.52 ± 0.21	5.64 ± 0.26
10mV (m·s <sup>-1</sup> ) adjusted for Body Mass	5.51 ± 4.6	5.52 ± 3.7	5.74 ± 4.4
Vmax (m·s <sup>-1</sup> )	8.10 ± 0.51	8.33 ± 0.43	8.56 ± 0.38
Vmax (m·s <sup>-1</sup> ) adjusted for Body Mass	8.05 ± 6.5	8.36 ± 4.3	8.85 ± 3.0
30-15 <sub>IFT</sub> (km·hr <sup>-1</sup> )	18.6 ± 1.1	18.7 ± 1.2	18.7 ± 1.3
30-15 <sub>IFT</sub> (km·hr <sup>-1</sup> ) adjusted for Body Mass	18.22 ± 5.1	18.74 ± 5.5	19.29 ± 5.9

Data presented as mean (±SD) for unadjusted measures; adjusted data are back-transformed log data (±SD as CV%).



**Figure 1.** Standardized mean differences in physical characteristics prior to, and following adjustment for body mass. # = unclear, \* = likely, \*\* = very likely, \*\*\* = almost certainly greater than the smallest worthwhile change (grey shaded area)

### Discussion

- Body mass did not explain differences in physical characteristics between age categories.
- 30-15<sub>IFT</sub> demonstrated *likely* differences following adjustment.
- It is likely that between-age category differences are training induced.
- Therefore practitioners should concurrently develop strength, power, speed and aerobic fitness concurrently within rugby union academies.

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